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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,963	11/09/2001	Chu-Fei Chang	ARC002US	5685

27906 7590 04/20/2005

PATENT LAW OFFICES OF DAVID MILLERS
6560 ASHFIELD COURT
SAN JOSE, CA 95120

EXAMINER

STREGE, JOHN B

ART UNIT PAPER NUMBER

2625

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/010,963

Applicant(s)

CHANG ET AL.

Examiner

John B Strege

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 20-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19, 28 and 29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/31/02.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's election without traverse of group 1 (claims 1-19 and 27-29) and species 1 (claims 28-29) in the reply filed on 12/21/04 is acknowledged.
2. Claims 20-26, and 27 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention and species respectively, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 12/21/04.

Claim Objections

3. Claim 1 and 14 are objected to because of the following informalities: Line 2 refers to "analyzing a plurality of image", this should be changed to --analyzing a plurality of images--. Claim 14 appears to be missing a transition word such as "further comprises" (at the end of line 1) to make the sentence understandable. For examining purposes the examiner will read this as "wherein generating a three-dimensional model of the object further comprises constructing..." Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1,5-10,14,16-19, and 28-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Niem et al. in the IEEE published article *Automatic Reconstruction of 3D*

Objects Using a Mobile Monoscopic Camera (as cited in the Information Disclosure Statement, hereinafter "Niem").

Regarding claim 1, Niem discloses an image processing method comprising: analyzing a plurality of images of an object (2nd paragraph of the introduction page 173, further seen in figure 1 page 174) wherein for each image, analyzing comprises: analyzing the image of an object to identify a mark from among a plurality of marks in a background of the object (paragraph under figure 1 on page 174, as seen in figure 1 the marks are in the background); identifying locations of a plurality of calibration points on the mark (2nd paragraph of section 3.2 on page 175); and using the calibration points in determining camera parameters for the image (1st paragraph of section 3); and generating a three-dimensional model of the object from the images and the camera parameters determined from the images (see at least the abstract and section 4).

Regarding claims 5-6, Niem discloses setting the object in an area enclosed by the calibration pattern (as seen in figure 1). As the calibration pattern is defined on a plane this can be read as a sheet.

Regarding claim 7, Niem discloses allowing for free movement of the camera and an independent choice of focus (2nd paragraph from the bottom of the 2nd column on page 173).

Regarding claim 8, the identified mark is separated from the object in the image as seen in figure 1.

Regarding claim 9, Niem discloses determining a transform from three-dimensional coordinates to two dimensional coordinates as seen in figure 9.

Regarding claim 10, Niem discloses identifying a silhouette of an object (as seen in figure 10); applying the transform for the selected image to three-dimensional coordinates of points from a candidate volume and constructing an approximate volume of the object from the points that the transform maps from the candidate volume on to the silhouette of the object in the selected image (sections 4.1 and 4.2 on pages 177-178).

Regarding claim 14, Niem discloses approximation the volume model using a triangle mesh (as seen in figure 11).

Regarding claim 16, Niem discloses analyzing a set of images containing an object and a background (already discussed above) to identify for each image a silhouette of an object and locations in the image of pattern points in the background (1st paragraph of section 4.1); for each image, using the locations of the pattern points to determine a transform from three-dimensional coordinates to two-dimensional coordinates in the image and transforming three-dimensional coordinates of a set of points in a candidate volume to the two-dimensional coordinates of a first of the images (section 3.3 and figure 9 on page 176); and identifying an approximate volume of the object as containing the points that the transform maps onto the silhouette of the object in the first of the images (as seen in figure 11).

Regarding claim 17, Niem discloses approximating the volume model by using a triangle mesh (as seen in figure 11).

Regarding claim 18, Niem discloses texture mapping in section 4.2 on page 178.

Regarding claim 19, Niem discloses that the calibration and reconstruction is carried out for each of the multiple input images (section 6).

Regarding claim 28, Niem discloses a reconstruction engine (section 4) comprising a silhouette extraction unit capable of extracting a silhouette of an object and locations of pattern marks from an image (as seen in figure 10 and two paragraphs following figure 10) a volume generator that receives the location of the pattern marks in an image and determines a transform for the image and determines three-dimensional coordinates of points on a surface of the object from the transform and the silhouettes (summary section on pages 179-180); and a reconstruction unit that constructs a three-dimensional model of the object from the three-dimensional coordinates of the points on the surface of the object (section 4.1 on page 177).

Regarding claim 29, Niem discloses that the algorithms used for the silhouette extraction and volume generator are software (paragraph under figure 10 as well as the abstract).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2-4, 11-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niem et al. in the IEEE published article *Automatic Reconstruction of*

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3D Objects Using a Mobile Monoscopic Camera (as cited in the Information Disclosure Statement, hereinafter "Niem").

Claims 2-4 are dependent on claim 1 (anticipated by Niem) and include the further limitation that the mark comprises a first rectangular segment having corners that are among the calibration points. Niem discloses that the position markers are inside rectangular quadrants (figure 1 and paragraph directly following it). Niem does not explicitly disclose that the corners of the mark are among the calibration points. However Niem does disclose that for the identification of the calibration points, at least one position marker and its two neighboring line segments have to be detected (second paragraph of section 3.2).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the corners of the quadrants as calibration points. Applicant has not disclosed that using the corners provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with Niem's invention because it is calibrating the camera using calibration points that are in the center of the quadrant, thus the end result of calibration is the same.

Therefore, it would have been obvious to combine using the corners of the calibration marks with Niem to obtain the invention as specified in claim 2.

Claims 11-12 describes determining whether or not the model is suitable and if it is unsuitable performing the steps of claims 9-10 until it is suitable. Niem does not explicitly disclose determining whether or not the model is suitable and repeating the

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steps performed until it is suitable but it would be obvious to do so since it is well known that the more data that for a passive three dimensional model to be suitable requires a number of input images, and if the model is unsuitable then more input images should be added. The motivation for doing so would be to have a model of sufficient quality for whatever purposes necessary.

Regarding claims 13 and 15, Niem discloses analyzing the image using software that distinguishes the silhouette of the object from the background (as seen in the second column of page 177). Niem does not explicitly disclose providing a user with a method for modifying of the silhouette. It is well known in the art of image processing to allow a user to modify an image, thus the examiner declares official notice. It would be obvious to one of ordinary skill in the art to modify a silhouette because images may arise in which the computer can not achieve the same quality of recognition of the silhouette as the human eye, thus the user would be able to judge this and make the necessary improvements.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

USPN 6,084,979 Method for creating virtual reality, see especially col. 7 lines 31-62.

USPN 6,781,618 Hand-held 3D vision system.

USPN 6,668,082 Image processing apparatus.

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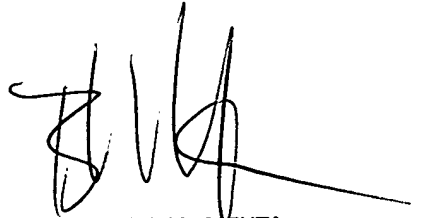
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B Strege whose telephone number is (571) 272-7457. The examiner can normally be reached on Monday-Friday between the hours of 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JS



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